The task of a formal epistemology is defined. It appears that a formal epistemology must be a generalization of “logic” in the sense of Wittgenstein’s *Tractatus*. The generalization is required because, whereas logic presupposes a strict relation between activity and language, this relation may be broken in some domains of experimental enquiry (e.g., in microscopic physics). However, a formal epistemology should also retain a major feature of Wittgenstein’s “logic”: It must not be a discourse about scientific knowledge, but rather a way of making manifest the structures usually implicit in knowledge-gaining activity. This strategy is applied to the formalism of quantum mechanics.

Key words: quantum mechanics, logical structure, Wittgenstein, philosophy.

1. INTRODUCTION

What makes possible the background against which is set our knowledge of the order of nature? “There,” said Kant, “solutions and answers are brought to a halt; because we must always go back to (this background) for all answers and all thought of objects” [1].

At least this setting of limits, typical of transcendental philosophy, points towards that which a formal epistemology cannot be. It cannot be the formalism of an objectified theory of knowledge which would take the subject-object relation as a second-order natural object, and would then leave unquestioned the grounding of normative presuppositions on which all science, including epistemology itself, depends. Further, a formal episte-
mology cannot conform to the definition “of a clearly too foolish ambition” which H. Putnam depicts as “[...] a superb theory of the normative grasped in its own terms” [2] ; a sort of redoubling of the realm of norms of thought, by which the theory would try to explain itself in objectifying the system of its own principles, without being able, except by an infinite regression, to question itself in return on its use of those very principles. Of course, these remarks are not to deny the current attempts at naturalising epistemology any interest. They are only aimed at pointing out that naturalisation of epistemology can only be a process with no foreseeable completion; and that at the provisional end of each step of this process there is a set of non-explicit norms of investigation which we can but call the “pragmatico-transcendental background” of the current state of research.

It is of no apparent advantage either to cast formal epistemology in the role of a mathematicised or logicised variant of epistemology in the modest sense traditionally intended in France: that of a multiplicity of critical analyses of the premisses and results of particular sciences. Because in epistemology, as in the sciences, formalisation consists in the abstraction of particular contents in order to reach universal rules. A formal epistemology must therefore be of value to any science, even if it is especially profitable (as we shall see below) when elaborating on the knowledge acquired by certain methodologically advanced sciences.

Having discarded some tentative definitions of formal epistemology it remains to give it a plausible positive characterisation. To that end a comparative rather than a directly constructive strategy will be used. A parallel will be established with the case of logic; the remarkable isomorphisms between logic and what we would expect of a formal epistemology will be underlined; then, at the end of the discussion, the bringing into consideration of some major differences between the two disciplines will allow the formulation of the specific project of formal epistemology. It will thus appear that formal epistemology can be understood as a generalisation of logic; a generalisation of considerable range because it principally consists in recognising the expansion of the form of the sciences beyond the closed domain delimited by the Logos, taken in its narrow sense of explaining by means of discourse consisting in predicative judgments.

2. LOGIC AND FORMAL EPISTEMOLOGY

Let us start from the dualistic prejudice of the theory of knowledge; because it is by way of criticising it that we will most quickly arrive at the point of neutral equilibrium where both logic and formal epistemology stand. Knowledge, according to Piaget [3], consists in a certain relation between a